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summer died, leaving a wife and two children almost penniless in Germany. It is almost impossible for Mrs. Tausch to support herself and her children in that country and unless she can do so the children will be placed in an orphanage. It is her wish to find means for herself and her children to return to America where the children were born and where she herself would be able to find work as a teacher. In Germany "hundreds like herself are already waiting for a position wherever there is an opening." Dr. Tausch published a number of valuable papers, notably a sympathetic review of Dr. James's "Pragmatism." A study of the psychology of Tolstoy is still unpublished, as well as an extensive volume on pragmatic philosophy. Should any one feel like granting aid to the widow of this gifted but unfortunate scholar money may be sent through the writer or to Madam Elizabeth Tausch, care Frau von Wissman Warkotsch Kreis, Strehlen, Schlesien, Germany.

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SCIENTIFIC BOOKS

The Humble-Bee, its Life History and How to Domesticate it, with Descriptions of All the British Species of Bombus and Psithyrus. By F. W. L. SLADEN. London, Macmillan & Company, Limited. 1912. Pp. xiii + 283; 6 plates and 33 text figures. \$1.50 net.

This account of the life-history of the humble-bee will be more than welcome to every entomologist and student of animal behavior, not only because it is written by an eminent authority on the honey-bee, but because it is one of those rare nature books that are the mature fruit of a life-long interest and occupation. The author is so intimately acquainted with every detail in the daily and seasonal life of the British humble-bees and its parasites, and handles his subject in such a clever and fascinating manner, that one may fail to appreciate the great amount of patient observation and toilsome experimentation on which his statements are based. With true British independence he refrains from annoy-

ing and confusing the reader with citations of the large and scattered literature of the subject. Almost the only continental work he cites on the habits of the humble-bee is the classic memoir of Hoffer, "Die Hummeln Steiermarks," published thirty years ago (1882). The more recent work of Wladimir Wagner, "Psychobiologische Untersuchungen an Hummeln mit Bezugnahme auf die Frage der Geselligkeit im Tierreiche," *Zoologica*, Heft 46, I. and II., 1906 and 1907, is not even mentioned, and one familiar with this work may be pardoned if he secretly hopes that Sladen has never seen it, not because it is devoid of considerable merit, but because its spirit gives one reason to suspect that Sladen might have become sophisticated by its perusal. There is, indeed, no better way of appreciating the English author's work than by following it with a perusal of Wagner. Both authors have independently discovered and described a number of important peculiarities in humble-bee life that were unknown to Hoffer, but how different is the view-point from which their observations are made! In Sladen's work the humble-bee is the heroine of the story. She moves before us in all the glory of her regal, velvety attire, with the joyous or apprehensive hum of incessant, arduous labor and self-sacrificing motherhood. In Wagner's account it is Wladimir Wagner who occupies the foreground as the somewhat bumptious scientist who looks at the humble-bee, makes an observation, forthwith settles its connection with some lop-sided hypothesis, incidentally belabors a few contrary-minded, or bestows his approval on a few like-minded students of animal behavior, and then repeats the process. Sladen, on the other hand, writes with charming, sympathetic insight, and utterly unmindful of committing one of the most deadly sins that it is possible for a modern student of animal behavior to commit, pens such sentences as the following, in which the italics are the reviewer's: "The queen's *intelligence* is seen at its best while she is thus *caring* for her brood, and her *devotion* to it, and her *alertness* on the slightest approach of danger, are most interesting to witness. She shows

no *desire* to escape unless she is severely molested and is quite *content* with her brood, *anxiously* incubating it day and night." This is the way Wagner, who is beset with a terrible anxiety lest he commit this deadly sin of "grober Anthropomorphismus," describes the behavior of the same insect: "Eine nicht weniger auffallende Erscheinung ist der Versuch der Hummel, das Nest auszubessern. Erregt durch das eindringende Licht, steigt sie von der Wabe auf den Boden herab und kriecht rückwärts zu derselben zurück, wobei sie die bei solchen Gelegenheiten üblichen Bewegungen des 'Zusammenscharrens' trockener Pflanzenteile ausführt, d. h. nicht nur Bewegungen macht, deren Bedeutung sie nicht versteht, sondern nicht einmal im stande ist, auch nur die geringsten Resultate ihrer Tätigkeit wahrzunehmen, welche sie nur aus dem Grunde ausübt, weil diese Tätigkeit eine Reaktion auf die Gesamtheit der äusseren Reize darstellt." Surely, if we may ask Sladen how he knows that the humble-bee experiences anything akin to the affection and solicitude of the human mother for her offspring, we may also ask Wagner how he knows that such a highly organized insect as the humble-bee is a mere machine and absolutely unable to appreciate the results of any of her activities. Such quotations reveal the difference between Sladen's and Wagner's methods of observation and incidentally between the two schools of animal behavior which they represent. To one the insect is a wonderful and inexhaustible living organism, whose activities can be most satisfactorily described in the language which we employ when speaking of another individual of our own species; to the other the insect is a pure mechanism, whose every movement is easily expounded by the observer, who stands in the foreground and uses the observed object largely as a means of displaying his own analytical and explanatory acumen. The student of animal behavior, who wishes to appreciate the merits and defects of each of these methods, can hardly do better than to read in close sequence Sladen's and Wagner's memoirs on the humble-bee.

Sladen's book begins with a brief introductory chapter on humble-bees in general, their geographical distribution, their relations to flowers and their more important external characters. This is followed by a beautiful account of the life-history of the British species, with excellent figures of their nests, illustrating the behavior of the queen in establishing the colony, and the growth and arrangement of the brood-comb and of the honey- and pollen-pots. The author's interesting and original classification of the British *Bombi* as "pollen-storers" (*B. lapidarius*, *terrestris*, *lucorum*, *soroënsis*, *pratensis*, *jonellus*, *lapponicus* and *cullumanus*) and "pocket-makers," which are subdivided into "pollen-primers" (*B. ruderatus*, *hortorum*, *latreillellus* and *distinguendus*) and "carder-bees" (*B. deshamedi*, *sylvarum*, *agrorum*, *helferanus* and *muscorum*) is described and illustrated in detail. The third chapter, devoted to the "usurper bees" of the genus *Psithyrus*, carries us well beyond the researches of Hoffer and gives us the complete life-history of these extraordinary parasites. As ascertained by Sladen, this life history resembles in the most striking and suggestive manner that of certain parasitic ants of the genera *Polyergus* and *Bothriomyrmex*, since the female *Psithyrus* usurps the position of the *Bombus* queen by killing her and securing adoption by her workers, which then assist the parasite in bringing up her brood.

The fourth chapter takes up the other *Bombus* parasites and enemies. These constitute a very large and motley assemblage of organisms, including the meadow mice, a peculiar wax-moth (*Aphomia sociella*) which devours not only the cells, but also the brood of the humble-bee, a Tachinid fly (*Brachycoma devia*), the highly mimetic *Volucella bombylans*, besides several other Diptera belonging to the genera *Fannia*, *Phora*, *Conops*, etc., several Hymenoptera, especially *Mutilla europæa*, certain Braconids and ants, more than 50 species of Coleoptera, among which *Antherophagus nigricornis*, a small beetle that is carried from the flowers, into the nests attached by its mandibles to the proboscis of the bee, is one of the most interesting, several

mites, a singular Nematode worm, *Sphaerularia bombi*, which lives in the abdomen of the queen, and a Microsporidian belonging to the genus *Nosema* and allied to the *N. apis* recently shown to be the cause of the "Isle of Wight disease" of the honey-bee. Several of these parasites may simultaneously attack a colony of humble-bees and completely destroy it in a very short time. The reviewer, on August 18, 1909, found under a stone at Zermatt, Switzerland, a small alpine humble-bees' colony which had been utterly wiped out by no less than three of these parasites. The cells and brood had been devoured by a mass of wax-moth larvæ (*Aphomia*) which were nearly ready to pupate. Among these lay a number of puparia of the Tachinid *Brachycoma*, while perched on the top of the nest among four dead and dying humble-bees was a fine female *Mutilla europæa*. It is certainly remarkable that notwithstanding the inroads of all these parasites and prædators and the small size of the colonies compared with those of many other social insects, the humble-bees, nevertheless, manage not only to survive, but to maintain their position among the commonest insects of the north temperate zone. And this dominance of the genus *Bombus* is even more surprising when we stop to consider that its species very easily succumb to excessive moisture, especially in countries like Great Britain.

Chapters V. to VII. of Sladen's work treat of the practical methods of studying the humble-bees, of finding and taking their nests, of the construction of artificial or observation hives, and of attracting to the latter the overwintered queens. In these chapters, which show how Sladen acquired his intimate knowledge of humble-bee behavior, we can also detect the advantages he has secured from his practical study of the honey-bee. By "domestication" he means merely the bringing of the humble-bee into the same relations to man as those obtaining in the case of the honey-bee. In the proper sense of the term, of course, neither of these insects can be domesticated.

The eighth chapter of the work is devoted

to the taxonomy of the British humble-bees and is illustrated by five fine colored plates, showing the males and females, and a plate of line-drawings, showing the male genitalia, of the 17 species of *Bombus* and six species of *Psithyrus* known to occur in Great Britain. The work concludes with a short chapter on making a collection of humble-bees, one containing a number of interesting notes and anecdotes and a brief appendix with some additional miscellaneous observations. It is certain that this volume will long remain a classic and an inspiration not only to British students of humble-bees, but to many of our entomologists, whom its perusal should encourage to acquire an equally intimate knowledge of the practically all but unknown habits of the numerous North American *Bombi*.

W. M. WHEELER

The Snakes of South Africa: Their Venom and the Treatment of Snake Bite. By F. W. FITZSIMONS. With 193 figures, mostly original photographs. New edition. Cape Town and Pretoria, T. Mashew Miller; New York, Longmans, Green & Company. Pp. xvi + 547.

This book is a natural history of South African snakes that, while written in a popular way and primarily for South Africans, and mainly devoted to the relations of the poisonous species to man, deserves to be brought to the attention of students of herpetology. The writer attempts to acquaint the residents of South Africa with the general habits of the snakes of their region, and to point out to the general reader, in simple language, the possibilities of being bitten by a poisonous snake, the action of the venom, and the best treatment that the investigators of the nature of snake venom have worked out.

As the principal aim of the book is thus to educate the non-scientific readers in a region where venomous snakes abound, one can not quarrel with the author for devoting considerable space to the poisonous species, even though his only original contributions to this subject are the results of investigations of the toxicity of the South African species. There